

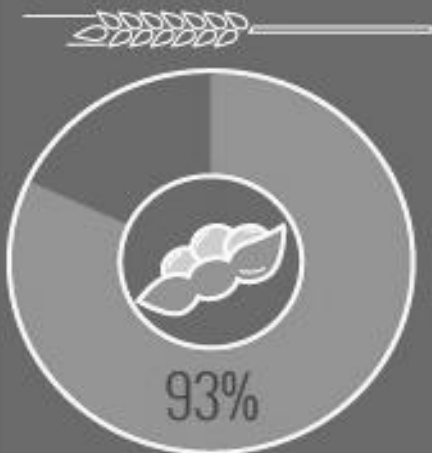
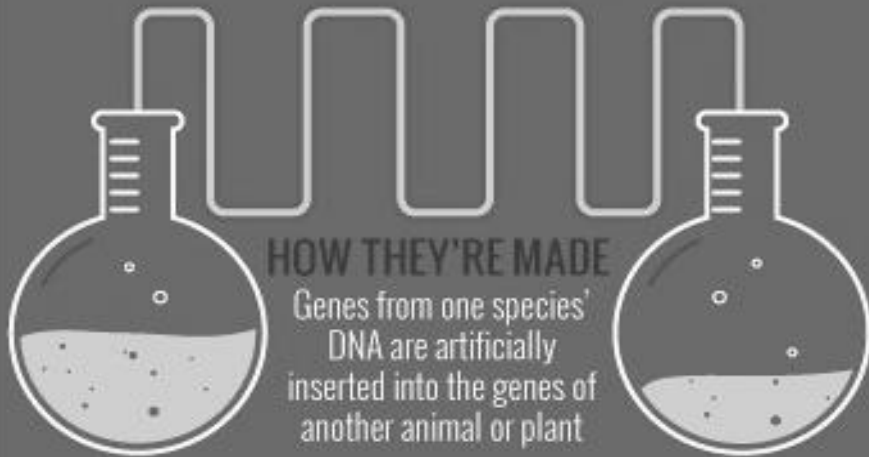
GMO's information- Use your graphic organizer to help you organize the information in this infographic.

THE GOOD, THE BAD, AND THE UGLY:

A SNAPSHOT OF THE GMO DEBATE

The debate continues over whether genetically modified organisms are out to save the world or destroy it. But the argument for either side is far from cut-and-dry. Learn the backstory on a few of the most pressing issues of the controversy.

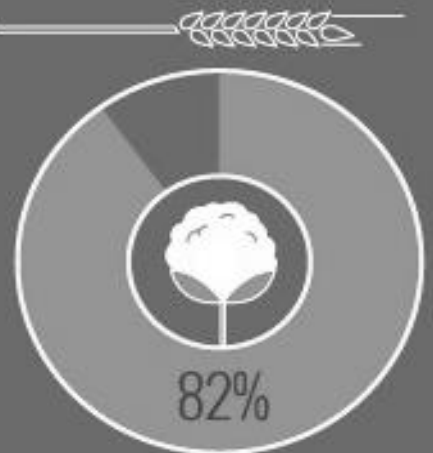
What Is a Genetically Modified Organism (GMO)?



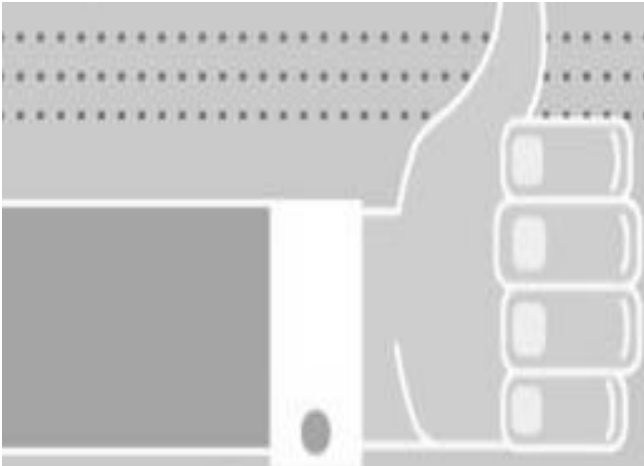
of soybeans are herbicide-tolerant




of corn acreage is genetically engineered



of cotton is herbicide-tolerant



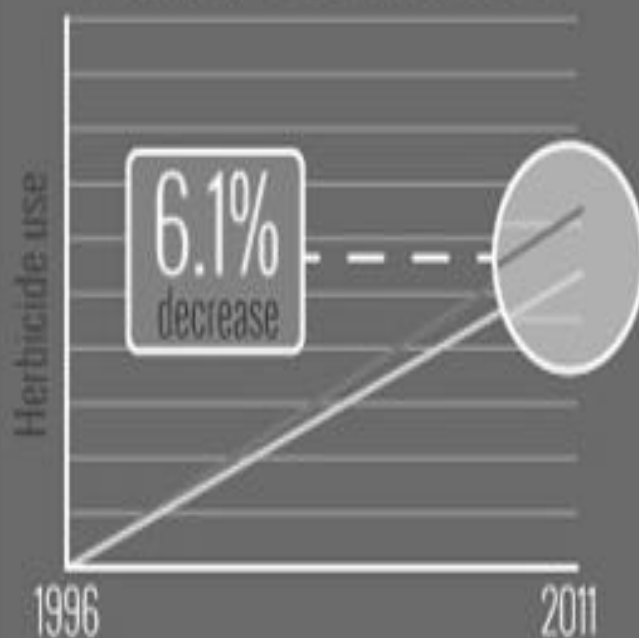
The Case
for GMOs



The Case
against GMOs

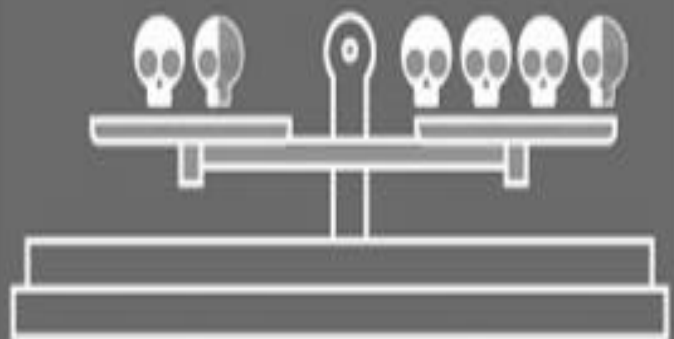
Less Herbicide Use, or More?

A study by PG Economics found a



in the use of herbicide on GM
cotton, 1996-2011, compared to
how much would have been used

Because of the development of
herbicide-resistant superweeds, a study
from Pennsylvania State University in
University Park predicts GM crop use
will result in more herbicide use:



2013:
About 1.5 kg.
per hectare

2025:
More than 3.5 kg.
per hectare

PRO

CON

Herbicide resistance develops no matter what:



64 weeds are resistant to atrazine, an herbicide that hasn't been paired with GM crops

Case study: 

Palmer amaranth

(*Amaranthus palmeri*)

Where: Southeastern U.S.

What: Evolved to be resistant to a combination of GM cotton and glyphosate, an herbicide

When: Late 1990s: Farmers start using the crop-herbicide combo

2011:

Palmer amaranth has spread to 76 counties Some farmers lose half their yield to this weed

Since Roundup-tolerant crops were first introduced in 1996,

24 glyphosate-resistant weeds have appeared in 18 countries 

The Ugly

A study by a Washington State University professor linked GM crops and superweeds to a



404 INCREASE
million-pound in pesticide use



between 1996 (when GM crops were introduced) and 2011

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The Impact on Yields

The International Service for the Acquisition of Agri-Biotech Applications claims that biotech crops increased production by more than



\$98 BILLION

1996-2011

A Union of Concerned Scientists review of



12

academic studies

covering 20 years found no increased yields among GM crops, except with Bt corn

The Ugly

The average Ugandan eats 1 pound of bananas per day



 = 1 oz.



A bacterial disease has reduced Ugandan banana yields **30-50%** in the last decade

Uganda's National Agricultural Research Organization has developed a bacteria-resistant banana, but GM crops are illegal in Uganda



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The FDA says GM plants must meet the same **REQUIREMENTS** as all other foods



A comprehensive meta-analysis conducted at Stanford University found no strong evidence that organic food is more nutritious or less likely to carry health risks compared to conventional foods



Agencies that have endorsed the safety of GM food include:

World Health Organization

U.S. National Academy of Sciences

American Medical Association

Animal testing has found evidence of the following possible health effects of GM foods, according to the American Academy of Environmental Medicine:



≡ Immune dysregulation

≡ Altered liver function

≡ Changes in the pancreas, kidney, & spleen



57% of Americans would be less likely to buy foods that are labeled GM

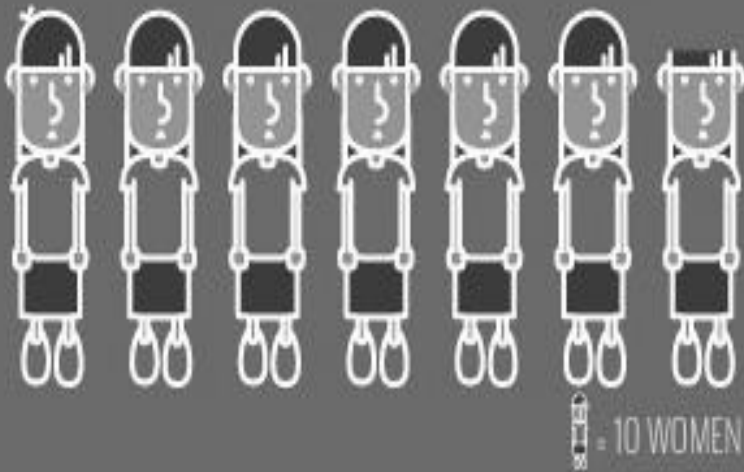
>60 countries require GMO food labeling because of concerns about their health impacts



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The Ugly



In 2011,
blood tests of
30
women in Quebec
of them pregnant
found pesticides associated with GM
foods circulating in their bodies and
their fetuses' bodies

The Financial & Social Impacts

As of 2012, Monsanto hadn't sued any farmers
for trace amounts of GM crops likely spread
through cross-pollination

Large GMO companies can sue farmers for
growing their seeds without paying royalties



American farmers were buying seeds
every year (rather than saving them)
before GM crops came along

Because the seeds spread naturally,
they're growing in other farmers' fields,
making these farmers susceptible to lawsuit



Poor farmers in developing countries may not
be able to afford to buy new seeds every year

Answer the questions in complete sentences on your paper.

1. What are GMOs?
2. How are they made?
3. What are some organisms that are mostly GMO?
4. Estimate what amount of decrease was used if 150 million pounds had been used the year before? (HINT- multiply \times 150,000,000)
5. Why do scientists need to be concerned about herbicide/pesticide resistant weeds?
6. What are some issues involved with the argument about how GMO has increased yields?
7. What is the argument and counter argument (for and against) in regards to the healthiness of GMOs?
8. Based on this information, formulate your own opinion about GMO's and write a 6 sentence paragraph. Use the check list to help you.

Argumentative Checklist

_____ Stance (opinion) is stated in the first sentence.

_____ Acknowledge and state the counterclaim:

Although some scientists may argue that the use of GMOs (are/are not) safe for consumption.....

_____ Select at least two reasons why your argument is correct. "Quote" parts of specific information from your infographic.

_____ Write a great concluding sentence that summarizes your ideas AND restates your claim.

_____ Use vocabulary from infographic.

_____ Follow all grammar and spelling rules.